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recently examined¹ a rock from the left bank of the Jamma, a tributary of the Blue Nile. This rock consists of the remains of orthoclase of the first generation in a groundmass of secondary quartz with little crystals of nepheline, orthoclase and amphibole. It is, according to Lévy, a type of rock between the tephrites and the phonolites.—In the same journal Lacroix has a note² on the basaltic rocks of County Antrim, Ireland. These are labrador basalts with a typical ophitic structure. They contain the following minerals in the order of their crystallization: apatite, magnetite, olivine, labradorite and pyroxene in lathe-shaped crystals, palagonite, hematite, chlorite and zeolites. The zeolites are in the cavities of the rock. A search was made for the native iron mentioned by Andrews as occurring in these rocks, but none was found.—Four additional parts of the "*Erläuterungen zur geologischen Spezialkarte des Königreichs Sachsen*"³ have just been published. The sections described are Oschatz-Mügeln by Th. Siegert, Falkenstein by Schröder, Wurzen by Schalch and Auerbach-Lengenfeld by Dalmer. These authors describe the Eibenstock tourmaline granite, the Kirchberg granite and the slates and sandstones metamorphosed by them.

MISCELLANEOUS.—The Denison University of Granville, Ohio, has just issued, in its Bulletin of the Laboratories of Denison University, a compendium of petrographical manipulation by C. L. Herrick. The first part is a condensation of the theoretical part of Hussak's book, in which many of the errors of the original have been rectified. The methods in use for the preparation and examination of rock section are described as clearly as might be expected in a treatise of such small size. Unfortunately a few mistakes still remain to confuse the student who attempts to make use of this little work without the aid of an instructor to explain away his difficulties. Most of these errors, however, seem to be due to too much hurry on the part of the composer. On page 132, for instance, the axes of elasticity are spoken of as optical axes. The second part is a translation of Hussak's tables. It is safe to say that in the hands of a conscientious teacher this little pamphlet of Mr. Herrick's will prove of great value to students who desire merely to gain some insight into the methods so generally made use of at present in the study of rocks.

BOTANY.⁴

CARBONACEOUS RESERVE FOOD-MATERIALS IN FUNGI.—M. L. Errera points out in the *Comptes Rendus* of the French Academy of Sciences a close analogy in this respect between fungi and flowering plants. In the seeds, tubers, &c., of Phanerogams

¹ *Comptes Rendus*, cii, No. 8, p. 451.

² *Ib.*, 454.

³ Cf. *AMERICAN NATURALIST*, April, 1886, p. 374.

⁴ Edited by Professor CHARLES E. BESSEY, Lincoln, Nebraska.

the food-material may be stored up either in the form of starch, inulin, &c., on the one hand, or in that of oil on the other hand. Exactly the same difference is observable in fungi, substituting only glycogen for starch or inulin. The great reservoirs of food-material in fungi are the sclerotia. The sclerotia of *Claviceps purpurea* contain oil, those of *Coprinus niveus*, *Peziza sclerotiorum*, &c., glycogen, while in other cases the food-material is accumulated, as in some seeds, in the form of thickenings of the cellulose-walls.

When sclerotia which contain glycogen germinate, the glycogen gradually decreases, while it accumulates in the growing fungus, in the stipes, pileus and lamellæ, into which it appears to pass directly from the sclerotium. In the germination of the sclerotia of ergot the oil rapidly disappears and is replaced by glycogen, which is, however, only of a temporary persistence, soon disappearing, and again making its appearance in the part when the fructification is subsequently formed. This resembles closely the phenomena which attend the germination of oily seeds like those of *Ricinus* and *Cucurbita*. Transitory glycogen is also formed in the germination of the spores of many fungi.—*A. W. Bennett.*

HENSLOW'S STUDIES OF EVAPORATION OF WATER FROM PLANTS. —In December, 1885, the Rev. George Henslow read a paper before the Linnean Society entitled, "A contribution to the study of the relative effects of different parts of the solar spectrum on the transpiration of plants," which is of such interest that we reproduce its more essential parts. After reviewing the work of other observers the author describes his method of work, which consisted in using glasses of different colors :

"The plan I finally adopted was to grow small plants in miniature pots two inches high and nearly two inches in diameter. These can be entirely wrapped up in gutta-percha sheeting, which is carefully bound round the stem of the plant with cotton-wool within and around the stem. This effectually prevents any evaporation from the surface of the earth or pot; and all loss of weight is due to the transpiration from the exposed surface of the plant alone.

"My experiments were made upon lettuce, box, *Echeveria*, small seedling palms, ferns, cactus and many other kinds of shrubs and herbs; having selected them with very various degrees of density in the epidermis, as well as of different families. The results would seem to entirely corroborate the conclusion of Weisner, that transpiration is mainly effected by the red, blue and violet rays, while the (optically) brightest rays of yellow and green are generally less able to effect it, *even if they do not hinder it*. I emphasize this sentence, as there appear to me to be grounds for coming to such a conclusion, as will be seen hereafter."

After detailing his experiments the following is given as the conclusion: "The above experiments, selected from a large series, seem to me to abundantly prove that Weisner's results are correct; and while recognizing the fact that obscure heat-rays cause a certain amount of the loss of water by evaporation, that transpiration *per se* (theoretically distinct from the purely physical process of evaporation, which takes place from all moist surfaces and bodies, dead or alive) is especially, if not solely referable to those particular bands of light which are absorbed by chlorophyll, and that such light, being arrested, is converted into heat, which then raises the temperature within the tissues and causes the loss of water. The only additional fact which I have here advanced, somewhat tentatively, is, that yellow light has a *retarding influence* upon transpiration, for the reasons given above. That 'life' has a retarding influence upon evaporation as distinct from transpiration, I think my experiments (which I hope to continue hereafter) have distinctly proved."

It will puzzle any one to make out a good reason for using two terms for the process of water-loss in plants. We have it said that "evaporation" is the "purely physical process," while the experiments show that what is called "transpiration" is, after all, a physical process also; and when we are told, as in the last sentence above, that "life has a retarding effect on evaporation," the confusion of ideas becomes somewhat embarrassing. Why not use but one term, and that the more general one—evaporation? The fact of modification or control of evaporation is so common a phenomenon in nature that we cannot regard it as of great significance. Common salt or sugar added to water retards evaporation.

The mutual attraction of the molecules of cellulose and water retards evaporation; so does the mutual attraction of the molecules of protoplasm and water. Heat increases the rate of evaporation, while a reduction of temperature (other things being equal) retards it, etc., etc. Why not call the loss of water in the plant what it is—evaporation, and then discuss the several modifying influences? Certainly such a course would contribute to clearness and accuracy, and would relieve the beginner of one of the difficulties in vegetable physiology.—*Charles E. Bessey.*

ELLIS AND EVERHART'S NORTH AMERICAN FUNGI.—The sixteenth and seventeenth centuries of this valuable distribution of dried specimens of the fungi were sent out early in March. With the fifteenth century the first series of centuries closed, and in order to mark its termination Mr. Everhart prepared an alphabetical index to all the species. The first fifteen centuries were published by Mr. Ellis, but now with the beginning of the new series the name of Mr. Everhart appears upon the title-page and the labels. As Series I included fifteen centuries, we may confidently hope that Series II will carry the work up to thirty centuries!

The centuries before us are largely devoted to the Sphæriaceæ and the so-called "imperfect fungi." The genus *Cercospora* is represented in Cent. xvi by twenty-five species, many of which have been but recently described. *Septoria* is represented in Cent. xvii by sixteen species, *Sphærella* by eleven.

We trust that this important work, which must be largely a labor of love, will go on to the completion of the second series, so happily begun.

BOTANICAL NEWS.—From the Transactions of the Institute of Natural Science of Nova Scotia we have a paper on the Canadian species of the genus *Melilotus*, by Professor George Lawson. —The eleventh annual report of the American Postal Microscopical Club contains a couple of pages of suggestive botanical notes from the "note-books" of the club. —Superposed buds are discussed by Aug. F. Foerste in a late number of the Bulletin of laboratories of Denison University. The paper is accompanied by a plate. —Dr. Farlow's paper on Biological teaching in colleges, published in the March number of the *Popular Science Monthly*, will be read with interest by every teacher of the "laboratory method" in botany. —The March *Journal of Mycology* contains descriptions of the species of *Phyllosticta*, *Claviceps* and *Cordyceps*, and also a sketch of the life and labors of the botanist Schweinitz, the latter accompanied with a portrait. —The March number of *Grevillea* is accompanied by pp. 113 to 128 of the new edition of Cook's Hand-book of British Fungi. Thus far the descriptions include 456 species, all of the genus *Agaricus*. —Late numbers of *Flora* contain an important paper, *Zur Systematik der Torfmoose*, by Dr. Röhl of Darmstadt. The "collective species," with their numerous varieties and forms, are fairly bewildering, and strongly suggest the inadequacy of the Linneæan nomenclature. —The Bulletin of the Torrey Botanical Club has been much improved the present year. Its Index to recent American botanical literature is now one of its most valuable features. In the February number L. H. Pammel publishes a paper on the structure of the testa of several leguminous seeds, accompanied by two plates. —In the March *Botanical Gazette* D. H. Campbell describes the development of the root in *Botrychium ternatum*, and J. N. Rose contributes an article on the mildews (*Erysiphe*) of Indiana. The June number of this invaluable journal is to be devoted to field and herbarium work, and hence will be of particular interest to collectors. —Henry Holt & Co., of New York, announce for early publication a Hand-book of plant dissection, by J. C. Arthur, C. R. Barnes and J. M. Coulter.